

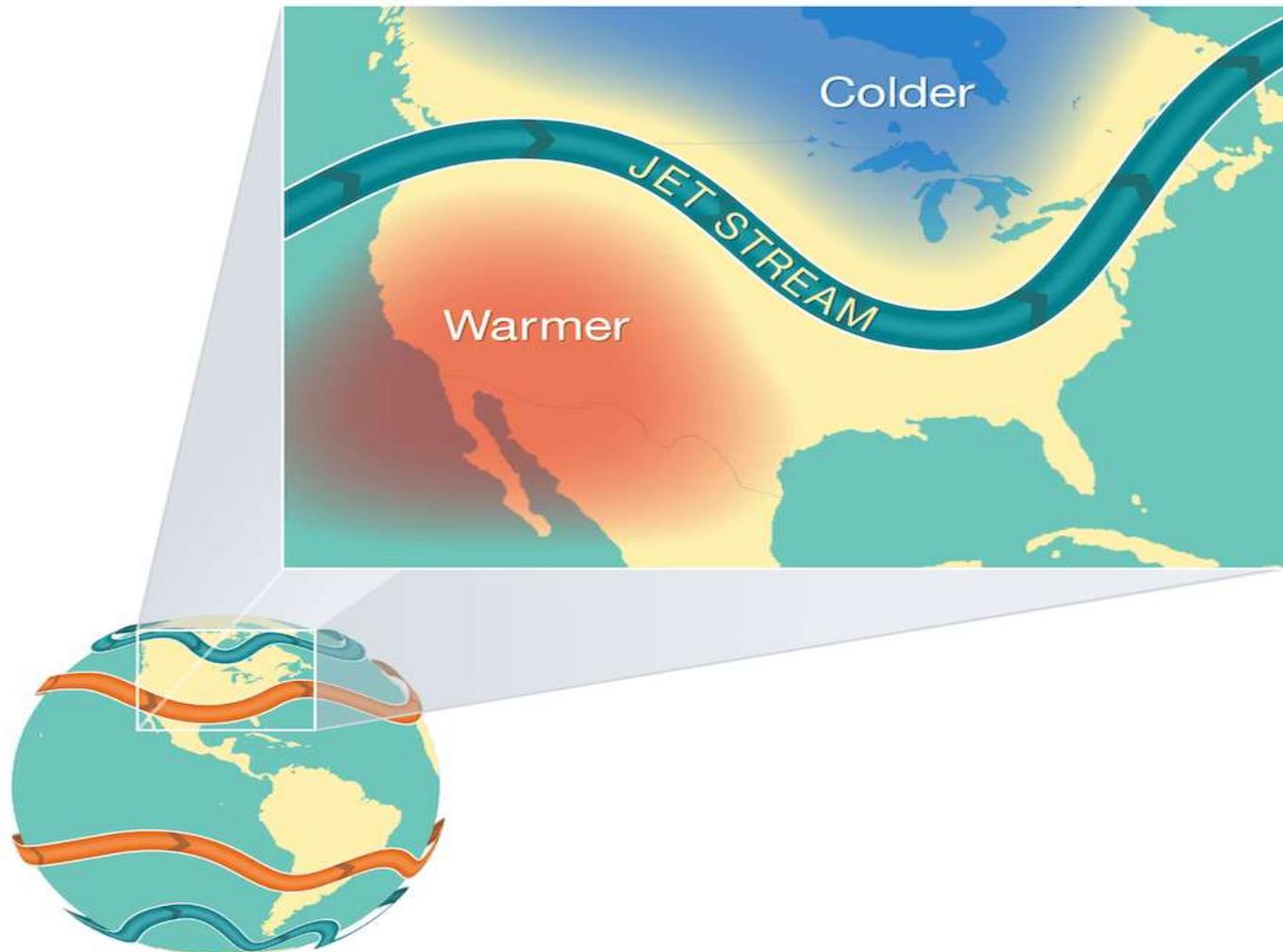
# JET STREAM

## DEFINATION

The Jet Stream is a geostrophic wind blowing horizontally through the upper layers of the troposphere. Jet streams are relatively narrow bands of strong wind in the upper levels of atmosphere. The winds blow from west to east in jet streams but the flow often shifts to the north and south. Jet streams follow the boundaries between hot and cold air.

"brief bursts of cold air have been blown into the region by the jet stream"

**On Earth there are four main jet streams: two polar jet streams and two subtropical jet streams. They form in the atmosphere where warm air masses meet cool air masses.**

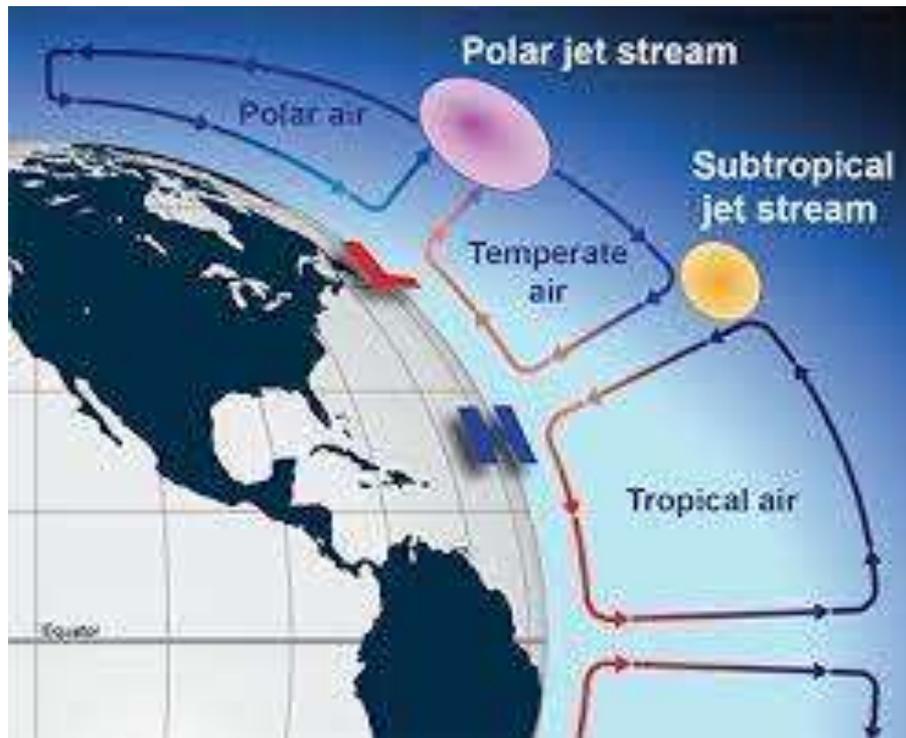


# Genesis of Jet Streams

- The genesis of the Jet-streams is provided by three kinds of gradients:
- Thermal gradient between pole and equator.
- Pressure gradient between pole and equator.
- Pressure gradient between surface and subsurface air over the poles.

# POLAR AND SUB-TROPICAL JET STREAM

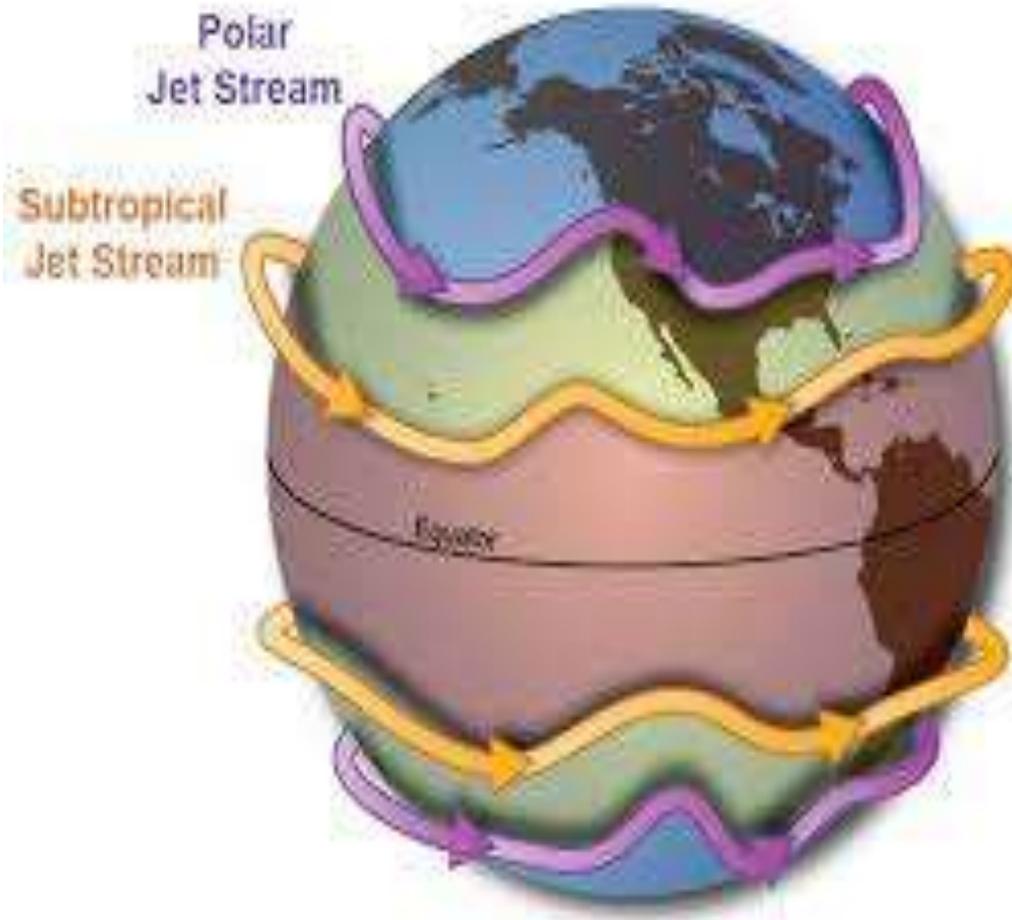
- NORTH HEMISPHERE CROSS SECTION SHOWING JET STREAMS AND TROPOPAUSE ELEVATIONS.



# Types of Jet Streams

- **Sub Tropical Jet Streams** are best developed in winter and early spring. Their max.speed approaches 300 knots which are associated with the merger with polar-front jets.a subsidence motion accompanies subtropical jets and gives rise to predominantly fair weather in areas they pass over.sometimes they drift northward and merge with a polar-front jet.
- **Tropical Easterly Jet Stream** occurs near the tropause over Southeast Asia,India and Africa during summer. This jet implies a deep layer of warm air to the north of the jet and colder air to the south over the Indian Ocean.The difference in heating and cooling and the ensuing pressure gradient is what drives this jet.
- Polar-night Jet Stream meanders through the upper stratosphere over the poles.They are present in the convergence zone above the sub polar low pressure belt.

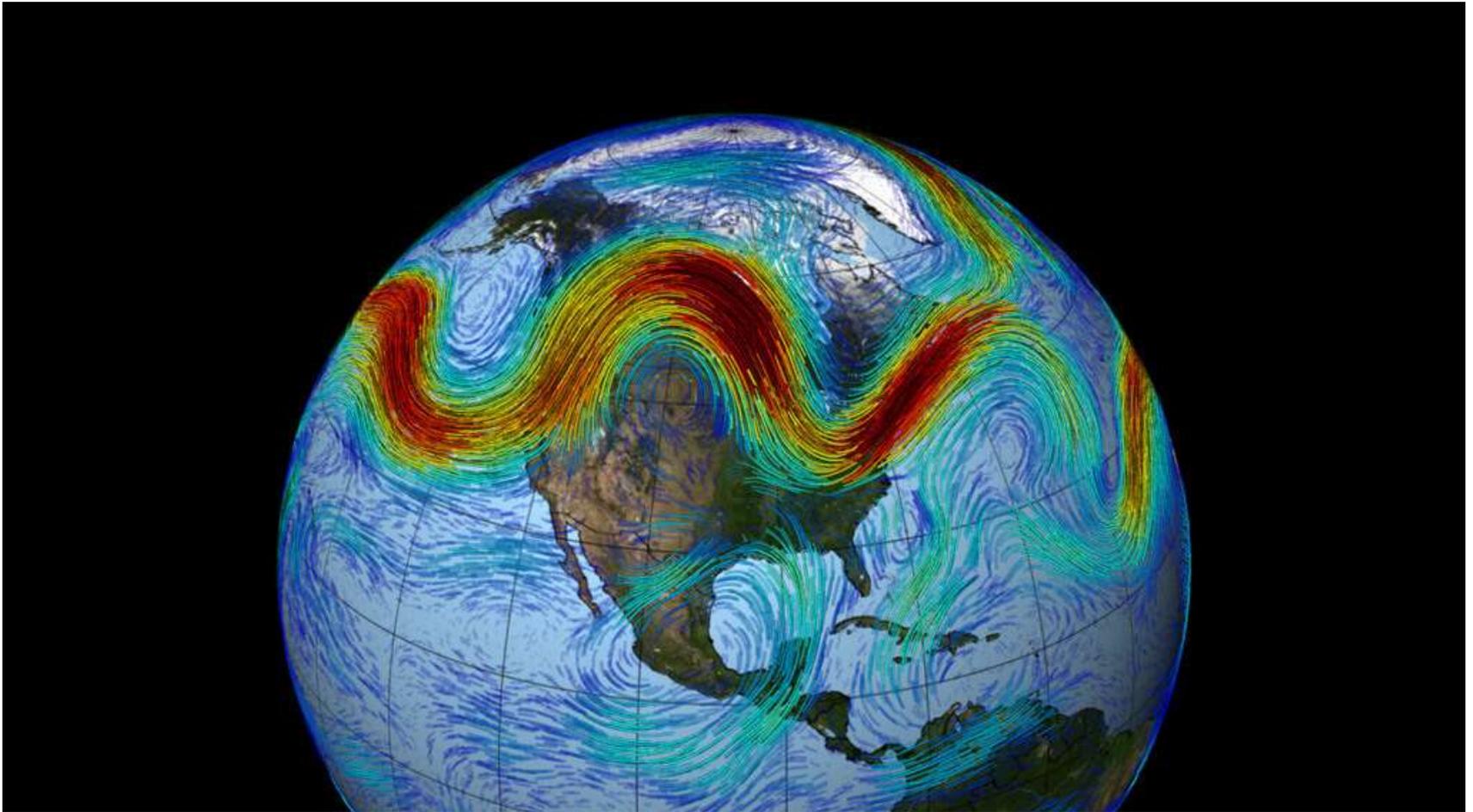
# JET STREAMS OCCUR IN BOTH THE NORTHERN AND SOUTHERN HEMISPHERES.



# Characteristics of Jet Streams

- The Jet Stream is a geostrophic wind blowing horizontally through the upper layers of the troposphere, generally from west to east.
- Its genesis is associated with the thermal contrast of air cells, example Ferrel cell Hadley cell.
- The meandering or the whirl movement of the Jet Stream is called 'ROSSBY WAVE'
- Equatorial extension of the Jet Stream is more in winter because of the southern shift of the pressure belts.
- During winters, the thermal contrast increases and the intensity of the high pressure centre at the pole increases. It intensifies the formation of Jet Streams, its extension as well as its velocity.

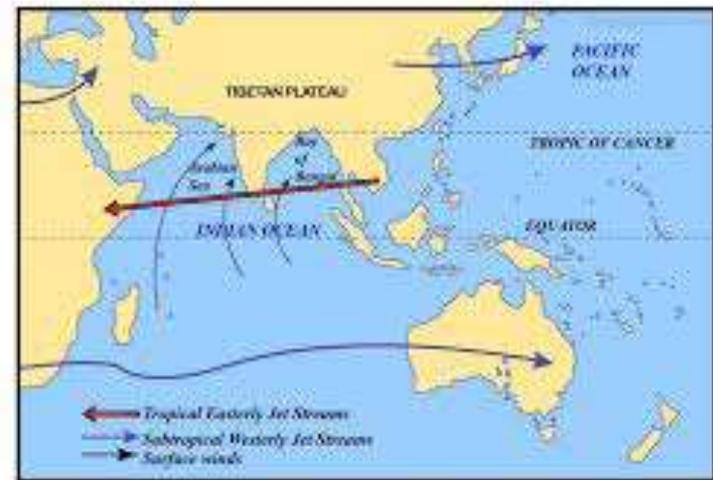
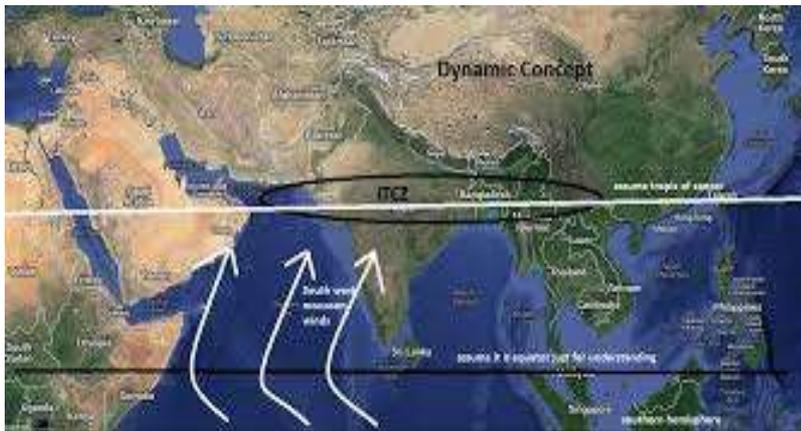
**A visualization of the Northern Hemisphere's polar jet stream swirling weather patterns from west to east across North America**



## Jet stream in India

- The south west monsoon coming in India is related to tropical easterly stream. It blows between 8 degree 35 degree North latitudes. The north east monsoon (winter monsoon) is related to the subtropical westerly jet stream which blows between 20 degree and 35 degree latitudes in both hemispheres.

# Atmospheric Conditions over the Indian Subcontinent in the month of June



*Atmospheric Conditions over the Indian Subcontinent in the Month of June*

# Dr.Kanailal Bhattacharyya College

- Semester- 5
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- Thank you
- Kakali Ganguly